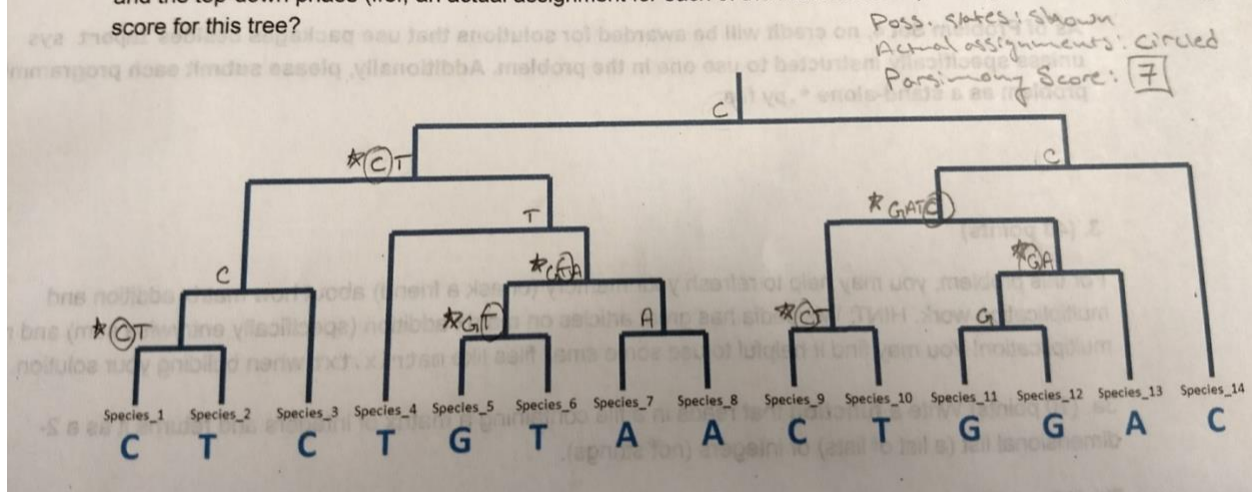


your answer show the results of both the bottom-up phase (i.e., the set of possible states for each node) and the top-down phase (i.e., an actual assignment for each of the internal nodes). Finally, what is the parsimony score for this tree?



1b. (10 points) If you were now given an additional species (species_15) with some nucleotide assignment and were told that this species is known to be an outgroup (first diverging species) to the above 14 species, by how much could the parsimony score change if you will add this species to the tree? Can the parsimony score go down? Would you have to apply Fitch's algorithm from scratch to get the new parsimony score?

I+ could go up by 1, no reapplication is required to get a new score, since score is found in the bottom up phase

2. (20 points)

2a. (10 points) Recall the hill climbing algorithm we described in class. Such an algorithm is often referred to as a "local" search. Explain, in your own words, what's local about this search.

The search only finds a nearby high point, as it stops once further climbing is impossible.

2b. (10 points) Draw all the possible trees resulting from Nearest-Neighbor Interchanges of the following tree:

